PSY K300, Fall 2021
Statistical Techniques – Syllabus

CLASS TIME AND PLACE
Section #22581
Asynchronous Video Lectures MW through Canvas
In-Person Workshops Friday 3:00 PM – 3:50 PM, in PY 101

INSTRUCTOR INFORMATION	**TA INFORMATION**
Instructor: Rick Hullinger Office: ~~PY A300B~~ Online only this semester Office Hours via Zoom: Monday 10:00 AM – 12:00 PM Tuesday 1:00 PM – 3:00 PM Or by appointment Office Telephone: 812-856-6854 Email Address: rahullin@iu.edu	TA: Samantha Heiman Office Hours: Either in-person (PY 224) or Zoom By appointment Email Address: slheiman@iu.edu

COURSE GOALS
Many students think of K300 as a math course. While it is true that we will perform some calculations along the way, this course is not about the math. I would consider this class a failure if what you learned to do was to plug numbers into arbitrary formulas for unknown reasons to generate more meaningless numbers. Instead, I want you to think about the underlying logic and principles of statistical analysis so that you understand *what the numbers tell you (and what they don't tell you)*, not just how to generate them.

This course will investigate statistics in a hands-on way. We'll explore the theories and concepts in lectures on Monday and Wednesday, and we'll put the concepts into practice in interactive workshops each Friday. This semester you will tackle the process of statistical inference using a variety of different approaches. Along the way you will gain a grounded understanding of how statistical inference works and learn how to use appropriate statistical techniques to solve new problems that you encounter after leaving this class. You will become a savvier consumer of the statistical (mis)information that bombards you every day and a better researcher should you choose to go in that direction.

In this course, successful students will be able to:

- Select and calculate appropriate descriptive statistics and make visual representations of data.
- Demonstrate an understanding of the importance of sampling randomness and measurement noise in statistical inference.
- Understand population parameters and how to estimate them.
- Pick an appropriate statistical technique to test a hypothesis about a particular treatment or experiment.
- Explain and interpret p values with respect to the null and alternative hypotheses.
- Interpret and manipulate basic statistical notations and formulas including summation notation and formulas for both descriptive and inferential statistics. Specific examples will include

formulas for the mean, variance, and standard deviation; calculation and interpretation of z scores and understanding of the standard normal distribution; and ability to conduct and interpret the results of t-tests.
- Perform a variety of statistical analyses either by hand or with the appropriate software tools.
- Discuss a set of results including p values, confidence intervals, and effect sizes, with respect to real world relevance and suggested next steps.
- Identify and critique examples of good and bad statistical reasoning in the popular press.
- Identify problems with classical statistical techniques and demonstrate an awareness of alternate methodologies including Bayesian ideas.

TEXTBOOK & COURSE MATERIALS

We will not be using a textbook for this course. All of the readings and notes and practice materials that you need will be presented in class and/or provided for you on Canvas.

LECTURE PARTICIPATION

Monday's and Wednesday's lectures will be presented as pre-recorded videos via Canvas. You are expected to watch these videos each week on Monday and Wednesday. Along with the videos, short lecture participation quizzes will be posted on Canvas. The quiz questions will be similar to the questions posed in the videos and all answers will be available in the lecture materials. You must complete these quizzes by 11:59 PM ET (Indiana time) on the day of the lecture and your score on these quizzes will make up your lecture participation score.

Each student will have their four lowest lecture participation scores dropped. Because each student gets four dropped scores, I do not make a distinction between excused and unexcused absences. If you miss lecture due to illness, oversleeping, travel, emergency, or do not complete a lecture participation quiz for any reason, participation for that lecture will be recorded as a zero.

If you need accommodations for observance of religious holidays, please contact me as indicated in the academic bulletin. All requests for accommodations must be made at least two weeks before the religious observance begins.

FRIDAY WORKSHOPS

Friday's class will be held in person in room PY 101. We will use these sessions to work through any confusion from the pre-recorded lectures and to explore software-based techniques for performing statistical analysis. I will use clickers (IU's Top Hat response system) to promote engagement and participation in these workshops, with a handful of clicker questions presented each Friday. To answer these questions, you will be required to set up a Top Hat account. Your responses to the clicker questions will make up your workshop participation credit.

Each student will have their two lowest workshop participation scores dropped. As with the lecture participation, there is no distinction between excused and unexcused absences from the Friday workshops.

Clicker misconduct (e.g., responding for anyone other than yourself, answering any clicker question while not physically in the classroom, etc.) will be considered academic misconduct, and will result in significant grade reductions or failure of K300 as well as other university sanctions.

HOMEWORK

After each Friday workshop, you will have access to a homework assignment that will focus on the concepts and the software that you learned about that week. You must complete each homework assignment and submit your work by 11:59 PM on Wednesday following the workshop. You are free to discuss the content and concepts of the homework with your classmates, but you must do your own work and the answers you submit must be your own. Each student will have their two lowest homework assignments dropped. Late homework will not be accepted.

EXAMS

There will be two sets of exams this semester. The first portion of each exam will be an in-class exam during a Friday class period that will cover your understanding of the conceptual basis of statistics. The in-class exams will be closed-book and closed-note. They will not require computations or the use of any software to analyze data. Following each of these exams, you will be given a take-home exam. The take-home exam will ask you to demonstrate your mastery of the concepts you have learned by analyzing new sets of data using the software and tools we have studied. Like the homework, you are welcome to discuss the take-home exams with your classmates, but you must do your own work and the answers you submit must be your own. Each exam will focus primarily on the new material learned since the previous exam, but questions about older material may be included as well.

There will be a cumulative final exam on Monday, Dec. 13th from 12:35 – 2:35 PM. The final exam will have the same format and style as the in-class exams.

If you have a scheduling conflict that will interfere with a workshop, turning in a homework assignment, or taking an exam at the scheduled time, you must let me know as soon as possible. Except for extreme and unforeseen circumstances, contacting me the day (or even worse, after) an assignment or exam is due will be considered an unexcused absence and will result in a zero on the late work.

Your final grade is computed using the following formula:

Lecture Participation:	12.5%
Workshop Participation:	12.5%
Average of your eleven best HW exercises:	25%
Average of your two in-class exams:	20%
Average of your two take-home exams:	20%
Final Exam:	10%
	100%

Grading Scale:

A+: 97.0%-100%;	A: 93.0%-96.99%;	A-: 90.0%-92.99%
B+: 87.0%-89.99%;	B: 83.0%-86.99%;	B-: 80.0%-82.99%
C+: 77.0%-79.99%;	C: 73.0%-76.99%;	C-: 70.0%-72.99%
D+: 67.0%-69.99%;	D: 63.0%-66.99%;	D-: 60.0%-62.99%

F: Below 60%

STUDENT RESPONSIBILITY

It is your responsibility to double-check your assignment and exam grades – both that the papers themselves were correctly graded and that the scores posted on Canvas match your actual grades. You have two weeks from the time an assignment or exam is returned to the class to address any grading issues. After that, the grades posted on Canvas will be considered final.

HEALTH AND SAFETY

IU is following recommended public health guidance in response to the pandemic. In recognition of all IU community members owe to each other, we expect every member of the IU community will adhere to all current policies and practices. For current information on that guidance see https://covid.iu.edu. Students are expected to follow the university directives and the classroom policies established by their instructors. Willful non-compliance with campus or instructor policies will be considered personal misconduct and will be handled following the procedures outlined in the Student Code of Conduct).

EMAIL

I expect you to be checking your IU email account (not just Canvas messages) no less than once a day. I will send frequent messages to the class with announcements, clarifications, instructions, and/or updates. You are responsible for the content of these messages exactly as if the material had been presented in class. Saying "I didn't read that e-mail" or "I haven't checked my e-mail for a few days" will not be considered a valid excuse for missing information. All class-wide messages will be sent using the Canvas Announcement tool, so archived messages can always be found on the Canvas sites.

FEEDBACK

Do not wait until the end of the semester course evaluations to let me know that I could be doing something better. Tell me as soon as possible so that I can make the class valuable and relevant as we go along. If you have any feedback, good or bad, about the course or how it's being taught, please feel free to send it to me *anonymously* using this link.

ACADEMIC HONESTY

This course is conducted under the University's Code of Conduct & Policies. Specifically, it is considered cheating if you obtain any kind of information about answers and solutions to the assignments in this course – exams and homework – from any non-intended source or conversely transfer such information to others. It is also considered misconduct if you lie to me about an absence or extension relating to a homework or an exam or misrepresent your presence in the lectures or workshops. The punishment for academic dishonesty will be no less than a zero on the assignment or exam and will likely be **failure of the course**. As per university policy, *all* incidents of academic misconduct must be reported to the Dean of Students office.

CLASS RECORDINGS

I will post the Monday and Wednesday lecture recordings to Canvas and I will upload recordings of the Friday workshop sessions after class on Fridays. You may watch any of the recordings online or download them for off-line viewing on your computer, smartphone, or media player. These recordings are copyrighted by me and provided by me and the University for your personal use. You may not share them, in whole or in part, without my prior written permission. Please see the copyright statement below for the full terms of use.

STATEMENT FOR STUDENTS WITH DISABILITIES

Every attempt will be made to accommodate qualified students with disabilities (e.g. mental health, learning, chronic health, physical, hearing, vision neurological, etc.) You must have established your eligibility for support services through the appropriate office that services students with disabilities. Note that services are confidential, may take time to put into place and are not retroactive; Captions and alternate media for print materials may take three or more weeks to get produced. Please contact Disability Services for Students (https://studentaffairs.indiana.edu/student-support/disability-services) at iubdss@indiana.edu or 812-855-7578 as soon as possible if accommodations are needed. The office is located on the third floor, west tower, of the Wells Library, Room W302. Walk-ins are welcome 8 AM to 5 PM, Monday through Friday. You can also locate a variety of campus resources for students and visitors that need assistance at: https://ada.sitehost.iu.edu/

SEXUAL MISCONDUCT AND TITLE IX POLICY

As your instructor, one of my responsibilities is to create a positive learning environment for all students. Title IX and IU's Sexual Misconduct Policy prohibit sexual misconduct in any form, including sexual harassment, sexual assault, stalking, and dating and domestic violence. If you have experienced sexual misconduct, or know someone who has, the University can help.

If you are seeking help and would like to speak to someone confidentially, you can make an appointment with:

The Sexual Assault Crisis Services (SACS) at (812) 855-5711 (counseling services)
A Confidential Victim Advocates (CVA) at (812) 856-2469 or cva@indiana.edu
IU Health Center at (812) 855-4011 (health and medical services)

It is also important that you know that University policy requires me to share certain information brought to my attention about potential sexual misconduct, with the campus Deputy Sexual Misconduct & Title IX Coordinator or the University Sexual Misconduct & Title IX Coordinator. In that event, those individuals will work to ensure that appropriate measures are taken and resources are made available. Protecting student privacy is of utmost concern, and information will only be shared with those that need to know to ensure the University can respond and assist.

I encourage you to visit stopsexualviolence.iu.edu to learn more.

BIAS-BASED INCIDENT REPORTING

Bias-based incident reports can be made by students, faculty and staff. Any act of discrimination or harassment based on race, ethnicity, religious affiliation, gender, gender identity, sexual orientation or disability can be reported through any of the options:

1) email biasincident@indiana.edu or incident@indiana.edu;
2) call the Dean of Students Office at (812) 855-8188 or
3) use the IU mobile App (m.iu.edu).

Reports can be made anonymously.

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DISCLAIMER

This syllabus is an outline of the course and its policies, which may be changed for reasonable purposes during the semester at the instructor's discretion. You will be notified in class and / or via email if any changes are made to this syllabus, and an updated syllabus will be provided on Canvas.

PSY K300, Fall 2021
Statistical Techniques – Schedule

Week		Date	Description
1	M	Aug 23	Introductions
	W	Aug 25	Levels of Measurement
	F	Aug 27	Workshop 1: Excel Basics
2	M	Aug 30	Histograms
	W	Sep 01	Central Tendency
	F	Sep 03	Workshop 2: Formulas and Central Tendency
3	M	Sep 06	No Lecture Materials: Labor Day
	W	Sep 08	Variability & the Standard Deviation
	F	Sep 10	Workshop 3: Excel Graphs and Histograms
4	M	Sep 13	Normal Distributions
	W	Sep 15	Z Scores
	F	Sep 17	Workshop 4: Excel Variability, Plots, and Z Scores
5	M	Sep 20	Models and Model Evaluation, Part 1
	W	Sep 22	Models and Model Evaluation, Part 2
	F	Sep 24	Workshop 5: Simulating and Evaluating Models
6	M	Sep 27	The Null Model
	W	Sep 29	p Values
	F	Oct 01	Workshop 6: Calculating p Values
7	M	Oct 04	Statistical significance
	W	Oct 06	Hypothesis Testing with Z Scores
	F	Oct 08	No Workshop: Fall Break
8	M	Oct 11	Consumer Statistics
	W	Oct 13	Exam 1 Review
	F	**Oct 15**	**Exam 1**
9	M	Oct 18	Experimental Designs, Part 1
	W	Oct 20	Experimental Designs, Part 2: Sources of Variability
	F	Oct 22	Workshop 7: Hypothesis Testing In Excel
10	M	Oct 25	Modeling the Null Hypothesis for Experimental Designs
	W	Oct 27	Introduction to the t Test
	F	Oct 29	Workshop 8: t Tests in JASP
11	M	Nov 01	Problems with Statistical Significance
	W	Nov 03	Effect Size and Confidence Intervals
	F	Nov 05	Workshop 9: Confidence Intervals and Effect Sizes in JASP
12	M	Nov 08	ANOVAs, Part I
	W	Nov 10	ANOVAs, Part II
	F	Nov 12	Workshop 10: ANOVAS in JASP
13	M	Nov 15	Correlation, Part I
	W	Nov 17	Correlations, Part II
	F	Nov 19	Workshop 11: Correlations in JASP

Week		Date	Description
14	M	Nov 22	Thanksgiving Break: No Lectures or Workshop
	W	Nov 24	
	F	Nov 26	
15	M	Nov 29	Meta-Analysis and Replication
	W	Dec 01	Exam 2 Review
	F	**Dec 03**	**Exam 2**
16	M	Dec 06	Linear Regression
	W	Dec 08	Bayesian Analysis
	F	Dec 10	Workshop 12: Review, Wrap-Up, Q&A
17	**M**	**Dec 13**	**Final Exam: 12:35 -- 2:35 PM**
	W		
	F		